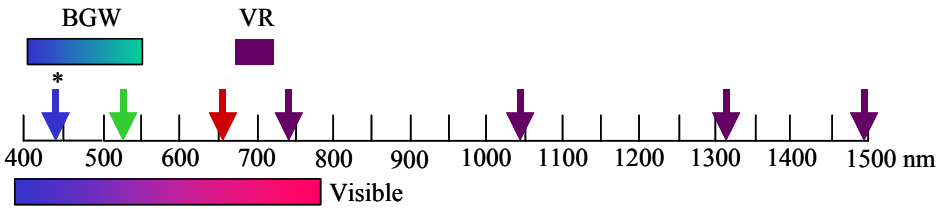
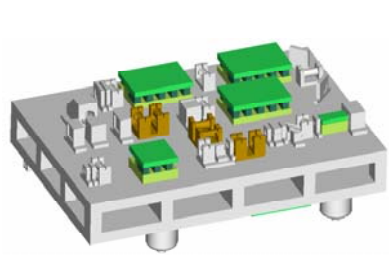
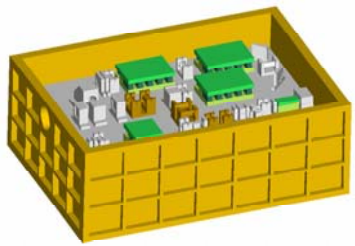
High-Energy, Multi-Spectral Laser for Surf-Zone Mine Countermeasures. Topic #N01-109







OBJECTIVES:

Overall Phase I/II Objective:

Build and deliver a multispectral transmitter to MARCOR. Transmitter will be interfaced to a government-furnished camera.

Phase I Objectives:

- Outline a sensor architecture and development path
- Develop detailed design for a high wall plug efficiency brassboard multi-line transmitter

PERFORMERS:

- Company Name: Coherent Technologies Inc.
  Address: 655 Aspen Ridge Drive, Lafayette, CO 80027
  Website/email. www.ctilidar.com Email iainm@ctilidar.com

PRINCIPAL INVESTIGATOR:

- Name Dr Iain T McKinnie
  Phone/Fax 303-604-2000 (ext. 132)

PHASE I/II/III Phase I

- Amount: $69,987

MCSC TPOC:

- Name Dr John Holloway
  Phone/Fax/Email

CONTRACT #: M67854-02-C-1007

CAPABILITIES:

- **Multispectral transmitter:**
  - 3 visible lines (523nm, 656nm, 745nm), 50-80mJ/line
  - 3 Near IR lines, 30-100mJ/line
  - Option for additional 438nm blue line
  - 1-3ns, 30Hz pulses for high range resolution
  - “Flat-top” beam for uniform illumination
  - Synchronized output for camera integration
- **CTI’s proprietary transmitter technology, providing superior performance than conventional laser architectures:**
  - compact, highly-efficient, ruggedizable hardware
  - Proven materials and designs
- **Aircraft-compatible Phase II hardware with a path to Phase III flight-qualified system.**

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Issues/Concerns: Risks and Mitigation Strategy

Risk Area	Mitigation
Transmitter Concept and Design	– CTI has many years of demonstrated experience in multi-spectral transmitters – Critical self-imaging waveguide technology leverages multiple recent and current efforts – Frequency conversion technology proven at CTI – Technology is generic and many other materials/ wavelengths can be used
Engineered System	– In house engineering (thermal, mechanical, electronic) expertise in rugged and F-Qual systems

Technical Innovations:

- **Breakthrough transmitter technology**
  - **Novel architecture eliminating vulnerable OPO/ OPA conversion stages and conventional resonators**
  - **Highly efficient, compact and ruggedizable self-imaging waveguide Nd:YLF lasers**
  - **100mJ, 1-3ns, 30Hz flat-top profile operation of waveguide lasers**
  - **Frequency conversion in simple Raman or SHG stages**

Transition/Commercial Applications:

Including: altimetry and ranging, terrain mapping, designation, ecology, search and rescue, medical, security/homeland defense

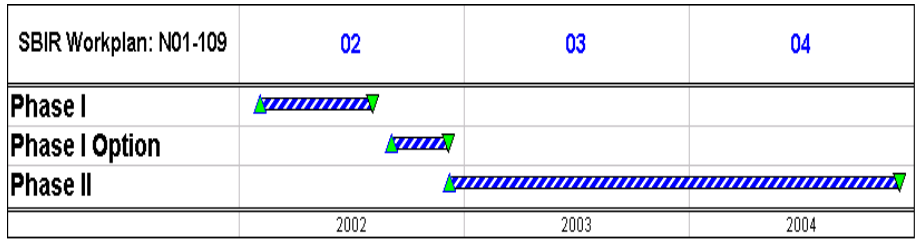
Development Plan:

1. **Phase II will develop a breadboard system for integration with COTS range-gated camera hardware and aircraft system tests**
2. **Ruggedization of Phase III engineered prototype brassboard system**
3. **EMD Phase leading to product development for DoD and commercial applications**

Evaluation Test Criteria:

1. **Transmitter performance (including pulse energy, wavelength, duration, rep. rate)**
2. **Transmitter size, weight, prime power to fit aircraft platform requirements**
3. **Camera range-gate synchronization**
4. **Multispectral, high resolution range-gated image data**

SCHEDULE:



FUNDING:

Phase I : $69,987

Phase I Option (proposed): $30k

Phase II (proposed) : $750k

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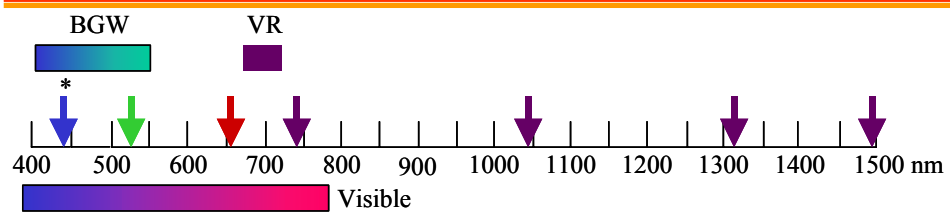
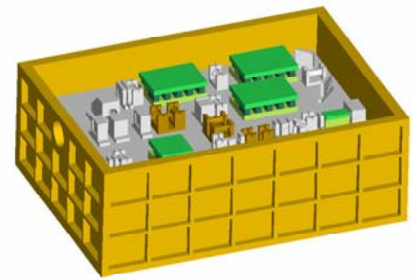




Objective:

Overall Phase I/II Objective:

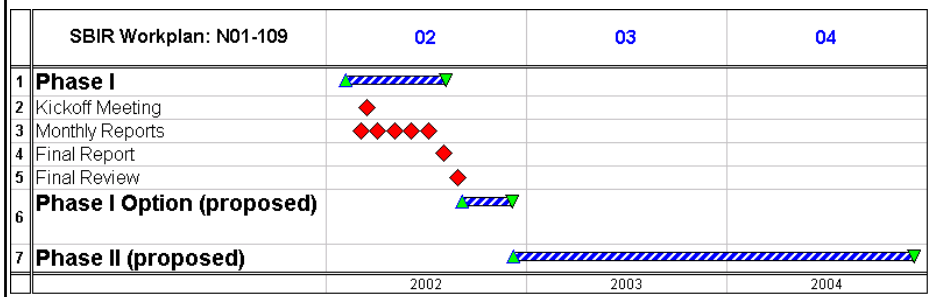
Build and deliver a multispectral transmitter to MARCOR. Transmitter will be interfaced to a government-furnished camera.

Capabilities:

- Compact, ruggedizable multispectral transmitter:
- Proprietary modular transmitter technology, providing high efficiency with simple spatio-temporal control.
- Aircraft-compatible Phase II hardware with a path to Phase III flight-qualified system.

Technical Approach:

Compact, ruggedizable and efficient short-pulse diode-pumped multispectral transmitter integrated with range-gated camera for high resolution 3D imaging.



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